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ABSTRACT

The Plus Program was designed to provide a maximum amount of remedial work in reading and mathematics for disadvantaged youth in grades 1-8. About 75 percent of the project pupils were black, 20 percent white, and 5 percent Puerto Rican. Specially trained teachers worked with small groups of students in programs designed to be corrective and supplemental to regular curriculum rather than developmental. In both the corrective reading and corrective mathematics programs, small groups and individual attention enables teachers to diagnose better the needs of students and to concentrate on strengthening weak areas. Parents were encourage to witness the progress of children. Lists of texts used for both programs are included along with specific examples of lesson exercises. The California Reading Test and the California Arithmetic Test (Forms W and X) were used to measure gains. Tables showing test data are included. (KG)

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Buffalo, New York

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Elementary Program in Compensatory Education 2

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BUFFALO, NEW YORK

One of a Series of

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Office of Education

Robert H. Finch, Secretary
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FOREWORD

This project report is part of an independent study of selected exemplary programs for the education of disadvantaged children completed by the American Institutes for Research in the Behavioral Sciences, Palo Alto, Calif., under contract with the U.S. Office of Education.

The researchers report this project significantly improved the educational attainment of the disadvantaged children involved. Other communities, in reviewing the educational needs of the disadvantaged youngsters they serve, may wish to use this project as a model - adapting it to their specific requirements and resources.

Bureau of Elementary and Secondary Education

THE PLUS PROGRAM IN BUFFALO, NEW YORK

Introduction

The Plus Program was designed to provide a maximum amount of remedial work in reading and mathematics for elementary school children in target areas. A staff of skilled teachers was employed to provide students with additional small group and individual instruction in specific areas of difficulty during the regular school day.

About 75% of the project pupils were Negro, 20% were white, and the remaining 5% Puerto Rican. Pupils ranged in age from 7 to 18 years and attended grades 1 through 8. They came from heterogeneous inner-city neighborhoods in which the occupations of heads of families varied from unskilled to professional, with some receiving welfare.

Participating children were selected by the principal with the assistance of the classroom teacher. When selecting children for the Reading Program, the reading teachers were also consulted. Achievement and readiness tests and the classroom teacher's estimates of the reading and arithmetic levels of the pupils were used as a basis for selection. In most cases, referrals were 1 to 2 years below grade level.

The program began in January of 1966 and has continued through the 1966-67, 1967-68, and 1968-69 school years to the present. In 1966-67 there were 6,700 pupils in the program from among 27,000 in 29 public and 24 parochial schools in Buffalo's target area. In 1967-68 the program enrollment increased to 7,436 pupils from 47 public and 25 parochial schools. Sixteen of the 72 schools included in the 1967-68 program were in non-target area schools which received inner-city Negro children who were participating in an integration program. Two-thirds of the project students were in the corrective reading program, with the remaining one-third receiving assistance in mathematics.

An evaluation of the 1967-68 program showed that pupils enrolled in the program made a mean gain of 8 months in reading achievement during the 7 months between testings, and of 9 months in mathematics during the 8 months between testings. These results are similar to those found in 1966-67. The California Reading and Arithmetic Tests were used in the evaluation.

Personnel

A. Project Administrator

The project administrator worked half time in the program. He held an MA in Administration Supervision, and had 7 years' experience as an assistant principal. He assumed overall responsibility for the direction of the program, planning the details of each phase.

B. Assistant Project Administrators

There were two full-time assistant administrators, both of them contract teachers with experience in the inner-city and supervisory certification.

One was assigned to the corrective reading program and one to remedial mathematics. They were in charge of the administration and supervision of the programs. Their duties included conducting in-service meetings, ordering materials, giving demonstration lessons, administering the program within the school, and supervising and evaluating the personnel.

C. Corrective Reading Teachers

There were 102 full-time and 10 part-time teachers. About 60% of them were certified by the State of New York and the Buffalo Board of Education. The remaining 40% were certified by the Buffalo Board of Education.* Eighty percent were women, and the rest men. In 1968 at least 75% had two years of experience in the program.

D. Corrective Mathematics Teachers

Fifty temporary teachers were employed by the program to teach remedial mathematics. As for the reading teachers, 80% of the mathematics teachers were women, and in 1968 at least 75% had 2 years of experience in the programs.

The duties of the corrective teachers consisted of teaching corrective reading or remedial mathematics classes. They were also assigned other school duties by the principal, such as substituting in classrooms in emergencies, assisting on bus trips, or cafeteria, hall, and outside duties.

E. Librarians

The seven full-time librarians were employed to maintain library facilities in target area schools.

F. Clerks

The two full-time clerks were responsible for keeping records, typing correspondence, and any other clerical activities related to the program.

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*All applicants must have a college degree and meet State certification requirements which consist of a specified number of education and subject matter courses. Successful completion of the Buffalo Teachers Examination is the final step in certification. Those teachers who do not meet State requirements in subject matter and education courses are in default of certification and must complete six hours per year until certification is met. Teachers are employed in default of certification only in the event that teachers meeting State requirements are unavailable.

Methodology: General

A. Corrective Reading Program

The program was initiated in response to certain needs which had been identified in the elementary classrooms of Buffalo's target area. They were:

1. The need to help the educationally disadvantaged child achieve as do his more fortunate peers from other areas;

2. The need to offer the classroom teacher a resource person in the teaching of reading, to aid with methods, materials, techniques and developments that would assist her in her reading program with all students; and

3. The need to narrow the range of achievement in the classroom through corrective classes for those who are not achieving at grade level, and in so doing aid in classroom instruction and management for all students.

To meet these needs a supplementary reading program which involved corrective procedures was designed with the following stated objectives:

1. To aid the classroom teacher in achieving the best reading program for her class;

2. To provide help for the classroom teacher in diagnosing and giving remedial assistance to problem readers; and

3. To teach phonetic and word-attack skills, comprehension, vocabulary improvement, and work and study habits with small group instruction and to encourage reading for recreation.

A staff of corrective reading teachers was hired to provide the additional services necessary to meet the program objectives. Each full-time teacher taught seven classes daily of five or six students each. Classes for primary students were 30 minutes long, while intermediate and junior high classes lasted 45 minutes.

There were 4,490 children from grades 2 through 8 in the program in 1966-67; in 1967-68 the number had increased to 5,017 from grades K through 8. Project pupils ranged in age from 7 to 13 years in 1966-67 and from 5 to 19 years in 1967-68. The program was designed for children under-achieving one or more years in reading.

Children were grouped according to their reading ability. Reading deficiencies were determined by use of phonic survey and Botel's tests. One-to-one teacher-pupil relationships were established to meet the individual needs of particular children.

The reading classes were designed to be corrective, rather than developmental. They supplemented the regular classroom instruction in reading; they did not replace it. The project children participated in all regular reading activities in the classroom and came to the corrective classes for special help in diagnosed problem areas.

The project teachers worked closely with the classroom teachers in designing a coordinated program of activities. In all corrective classes, emphasis was placed on the integration of reading, writing, listening, and speaking. A constant attempt was made to tie activities to familiar experiences whenever possible.

Since each teacher individualized her classes to meet the special needs and interests of the students, the program content could differ greatly from class to class. Teachers chose from among 15 series of textbooks, workbooks, etc., and 115 different paperback books, those most appropriate for a particular group or individual.

Reading materials were obtained bearing in mind the backgrounds of the children in the target areas. Textbooks such as The Bank Street Readers and materials for Spanish-speaking children were provided. Audio-visual materials for Spanish-speaking children were used in some schools. Books of high interest and low-level vocabulary content as well as recreational readers from pre-primer to grade 5 were provided. Teaching aids such as tape recorders, overhead projectors, record players, filmstrip viewers, duplicating masters, charts, and teaching games were also used.

Although program content varied from class to class, the amount of time that should be spent on different types of activities was recommended by the Project Administrator. At the lower levels, activities included reading from books and practice with workbooks. At the intermediate levels, skill type materials, such as Reader's Digest Skill Builders and other reading materials, including programed materials, were used.

Before their assignment to a school, the teachers were given five days of training by two reading specialists. This included lectures on the background and language development of disadvantaged children, testing, grouping, and record keeping. The teachers were also instructed in methods, use of materials, and demonstrations with children. Participation by the teachers included lesson planning and practice in manuscript writing.

Two in-service programs for reading teachers, the Intern Programs, were conducted in the summers of 1966 and 1967 at the School #46 Reading Center. The objective of these programs was to train the teachers to be corrective reading teachers as well as resource persons who could assist in the total school reading program of a core-area school. The first summer 14 experienced teachers, chosen because of their outstanding ability as teachers, attended the course and received intensive training provided by three reading specialists. In addition to teaching remedial reading classes in the Plus Program, they attended lectures at the Reading Center three afternoons a week for a year to complete their training. The second summer, 12 teachers attended a similar in-service program which lasted 6 weeks.

A small percentage of the reading teachers (15 teachers) also received training during another in-service program in the summer of 1967. This program comprised daily sessions from 9:00 AM till noon. One hour was for small group instruction and two hours were for lectures on methods and planning and evaluation presented by the group leader. Daily supervision and demonstrations were also included.

In addition, specialists and resource personnel were available to the teachers during the year to discuss materials and methods of instruction and the disadvantaged child.

B. Remedial Mathematics Program.

The Remedial Mathematics Program was organized to meet needs similar to those which had been identified in the Reading Program, i.e., assist the educationally disadvantaged child, provide the classroom teacher with a resource person for the teaching of mathematics, and narrow the range of mathematics achievement in the classroom. Accordingly, the objectives of the Mathematics Program were also similar to those in reading. They were:

1. To aid the classroom teacher in achieving the best mathematics program for her class;

2. To provide help for the classroom teacher in diagnosing and giving remedial assistance to students having poor achievement in mathematics; and

3. To teach number concepts and operations and problem solving through small group instruction and to improve work and study habits.

To meet these objectives, remedial mathematics instructors provided assistance in a tutorial situation to groups of six children. Each teacher scheduled six to seven groups a day, for a total of 36 to 42 pupils per week. Homogeneous grouping was used whenever possible to increase the efficiency of instruction. The daily sessions varied from 30 to 45 minutes depending on the grade level of the children.

The program was designed for children in grades 1 through 8, underachieving one or more years in arithmetic, but with potential. In 1966-67 there were 2,210 children in the program, their ages ranging from 5 to 15 years. In 1967-68 the number had increased to 2,419, with ages from 5 to 18 years.

As with the corrective reading classes, the remedial mathematics classes were designed to be corrective, rather than developmental. The remedial teachers worked closely with the classroom teachers in designing a coordinated program of activities. Emphasis was placed on the use of manipulative materials to give concrete examples of how numbers work. Number concepts were discussed, rather then learned by rote.

Due to the individualization of instruction, program content differed from class to class. The program teachers could select appropriate materials from among 78 different visual-manipulative items (such as flash cards or measuring sets) and two mathematics texts with applied materials for reference and use. In addition, filmstrips and overhead transparencies were

supplied to each teacher along with the appropriate equipment. Teachers were also encouraged to use their own ideas to develop materials appropriate to their situation.

All teachers participated in a 4-day orientation program prior to assignment. In addition, ten mathematics teachers attended an in-service training course in the summer of 1967. Monthly in-service programs were held for all teachers during the school year to facilitate communication and provide further instruction in methods and materials. In addition to consultants and resource personnel, ten 16mm films from the United World Film Company Series entitled "Mathematics for Elementary School Teachers" were used in these monthly meetings.

In both the corrective reading and corrective mathematics programs, small groups and individual attention enabled teachers to diagnose better the needs of each child, and to concentrate on the development of the specific reading or mathematics skills required in each case. Children had a better chance for successful experiences because instruction was geared to their ability and, with more successful experiences, a positive change of attitude toward self and school was brought about. Also, with small groups, it was possible to provide wide-scale instruction; children got to know their teachers better; and those previously too shy or afraid to participate in class had an opportunity to do so.

Attempts were made to involve parents in the progress of their children in the program. Every parent was invited to individual parent-teacher conferences at the beginning and end of the program to discuss the progress of her child. They were also encouraged to view the program while it was in operation during the school year and were invited to come in at any time.

In addition to the corrective classes themselves, project pupils received the benefits of three other aspects of the Plus Program which were in operation in the target area schools at the same time. They were an art-music-physical education program to provide enrichment lessons for pupils in grades 1 through 3; a pupil personnel services program to provide extra guidance services for grades K through 8; and a field trip program to provide information and transportation for four field trips per year for grades 1 through 8. All students in the target area schools participated in these programs, both those who were taking part in the remedial classes and those who were not.

Methodology: Specific

A. Reading: The following example would be illustrative of the attempt to integrate the exercise of skills of reading, writing, speaking, listening, and thinking in a single, small-group experience.

An administrator in a school had addressed the youngsters, urging them to participate in the school candy sale and to set new sales records. Later the reading teacher noticed that youngsters in her small group were concerned about their role in the project. She suggested they share their concern within the group. Several youngsters indicated they would probably be unable

to set a record of sales. The teacher guided the discussion to include reactions to, or examples of success and failure. She then guided the students in writing a brief paragraph about success and failure. In so doing, she led them in building vocabulary, spelling skills, punctuation, and phrasing. Later some of the writing was offered to others in the group to be read and reacted to; this in turn stimulated further discussion. Thus, from a human concern of the students themselves there came exercises in reading, writing, speaking, listening, and thinking. Each child participated as his abilities permitted, and was guided and encouraged by the teacher in the small group.

B. Reading: Fifteen different series of reading textbooks were ordered for use in the program. They were:

Macmillan Company	Textbooks, workbooks, and teachers guides for In the City (PP 1) through Around the Corner (3.2)
Houghton Mifflin Co.	Getting Ready to Read Series and Primary Kits for Spanish Speaking Children
Bobbs-Merrill Co.	Ready to Read through Shooting Stars
McGraw-Hill	New Practice Readers, Series A-D
Lyons and Carnahan	Phonics We Use, Books A-F
Barnell Loft, Ltd.	Working With Sounds A-D, and Locating the Answer A-F
J. B. Lippincott	Reading for Meaning, Books 4-6
Reader's Digest Services, Inc.	Reading Skill Practice Pads 1-3 and Advanced Practice Pad
Ginn and Co.	Word Enrichment Program, Novels 1-4
Continental Press Inc.	Beginning Sounds I and II, A Trip Through Wordland C and D, and Adventures in Wordland E and F
J. L. Hammett Co.	16 sets of phonetic games and puzzles
Garrard Publishing Company	7 sets of word card games
Charles E. Merrill	Bibs and Nip the Bear
Science Research Associates	S.R.A. Reading Laboratory 1-C
Harcourt, Brace and World, Inc.	Speech to Print Phonics and Phonics Practice Program

C. Reading: In addition to the textbook series, paperback books were available for use in the corrective reading program. These paperbacks were selected by committees of teachers and parents. The project children were encouraged to take home at least one book per week for independent reading. Below are some typical titles from the list of over 100 purchased.

Title	Author	Level
All Kinds of Bab Babies	Selsam	K-3
Bears	Krauss	K-3
Benjamin Budget & Barnaby Bell	Heide	K-3
The Happy Egg	Krauss	K-3
Just Me	Ets	K-3
No Roses for Harry	Zion	K-3
The Snowy Day	Keats	K-3
What Mary Joe Shared	Udry	K-3
What Whiskers Did	Carroll	K-3
The Case of the Hungry Stranger	Bonsall	K-3
Clifford Gets a Job	Bradwell	K-3
Clifford Takes a Trip	Bradwell	K-3
Congo Boy	Clarke	K-3
Magic Secrets	Wyler & Ames	K-3
Not This Bear	Myers	K-3
Coyote for Keeps	Johnson	3-7
Mr. Widdle and the Sea Breeze	Stover	2-6
The Story of Doctor Doolittle	Lofting	4
The Voyages of Doctor Doolittle	Lofting	4
The Saturdays	Enright	3-7
All-of-a-Kind Family	Taylor	3-7
More All-of-a-Kind Family	Taylor	3-7
The Beech Tree and Johnny Jack and His Beginnings	Buck	2-5
Harriet the Spy	Fitzhugh	5
I Go By Sea - I Go By Land	Travers	3-7
Call Me Charley	Jackson	3-7
Charley Starts from Scratch	Jackson	5-8
The Water Buffalo Children and the Dragon Fish	Buck	2-6

John F. Kennedy	Groves	2-6
Abraham Lincoln	Clover	2-6
Florence Nightingale	Clover	2-6
Helen Keller	Graff	2-6
Melindy's Medal	Faulkner	3-5
A Present From Rosita	Edell	3-5
Hold Fast to Your Dreams	Blanton	7-9

D. Mathematics: Two basic textbook series were used for the remedial mathematics program. They were: Sets and Numbers: Modern Mathematics, K-6 by Suppes and Arithmetic, 1-8 by Laidlaw. The following visual-manipulative materials were also available for use:

Addition, subtraction, multiplication and division flash cards
Toy money kit
Plastic counting disks
Set of number lines, 0-100
Set of Judy number indents
Set of Judy color shapes
Rubber stamp clock face
Set of Instructo numerals, words, and symbols
Fractional number line
Set of Instructo modern math symbols
Kit on reading whole numbers
Kit on the introduction of sets and numbers
Kit on operations on sets and numbers
Teacher's Judy mint-clock
Liquid measure set
Dry measure set
Modern computing abacus
10-bead numbers fact finder
20-bead numbers fact finder
Number frame
Place value chart
Set of expanded notation cards
Decimal place value card
36" x 48" flannel board
One-hundred chart
Number concept chart
Fractional chart
Equivalent chart
Matrix chart for multiplication
Square yard

Set of number readiness posters
Set of arithmetic process pockets
Judy calendar
Set of primary number lines
Set of enlarged fractional parts with a cohere-p-graph

Perimeter area board
Giant rule
Enlarged thermometer
Set of primary number cut-outs
Counting frame
Set of alphabet capitals
Set of lower case letters
Kit on "visualizing elementary mathematics"
"Judgments and Readiness" set
Teacher counting frame
Pattern board set
Set of additive sticks
Ten-ten board
Set of colored rods
Time learning set
Set of ones-tens-hundreds
Rubber stamp of 1-10-100
Set of oriental abaci
Set of numerals and relations
Magnetic board with a bag of disks
"Base and place" set
Set of simple fractions
Set of advanced fractions
Linear measurement set
Area and perimeter measure set
"Introductory geometry" set
Teacher's set of geometric solids

Evaluation

A. Measures of Achievement

The initial half-year of the project (January to June, 1966) was a period of organization during which administration details were worked out and the responses of students, teachers, and administrators were assessed. No data were collected at that time.

In 1966-67 the California Reading Test and the California Arithmetic Test (Forms W and X) were used to determine gains. Lower Primary, Upper Primary and Elementary editions were employed as appropriate.

The tests were administered by the project teachers to all pupils who were in attendance on the testing dates. The pretest was administered during the first two weeks of October and the posttest during the last two weeks of May.

A total of 3,298 children were present at both pre- and posttesting in reading. The evaluation was based on the results from 15 schools which were representative of the inner-city district. The entire tested populations of these schools were used as the sample, which numbered 824. The sample pupils comprised the classes of 20 teachers out of a total of 105 in the project. The results showed mean gains of 8.2 months in

Vocabulary, 9.6 months in Comprehension, and 8.9 months in Total Score, during the 7.5 months between testings. In all cases, the mean gains were greater than the time between testings.

The results in mathematics for that year were not quite as exceptional. A total of 1,663 pupils were present at both testings. An analysis of their scores revealed a mean gain of 7.3 months in arithmetic placement during the 7.5 months between testings.

The California Reading and Arithmetic Tests (Forms W and X) were used again in 1967-68 to measure gains. The administration procedure was similar to that used in 1966-67.

Pupils in the Reading Program were pretested during the first two weeks of October and posttested during the last two weeks of May. A total of 5,017 pupils took both tests. Table 1 shows the mean gains in terms of grade equivalents for a random sample of 921 pupils. Sample students were selected by taking every fifth child in an alphabetical list by schools. Fifty-six of the 921 pupils in the sample (6%) were also part of an integration study.

TABLE 1

Average Reading Gains in Grade Equivalents for Pupils in the Plus Program 1967-68

Grade	Sample N	Total N	Pretest Mean	Posttest Mean	Mean Months of Gain in 7.5 Months
K	0	24	-	-	-
1	12	72	1.3	1.7	4
2	233	1323	1.3	2.0	7
3	218	1177	2.0	3.0	10
4	198	1034	3.0	3.9	9
5	125	642	3.9	4.7	8
6	87	468	4.8	5.8	10
7	31	171	5.4	6.1	7
8	17	106	6.4	7.1	7
Total	921	5017			8

As can be seen from Table 1, the mean gains for the total sample and for grades 3, 4, 5, and 6, representing two-thirds of the reading pupils, were greater than the time between testings. While the 6% subsample of pupils who were also participating in an integration study which has shown gains in cognitive achievement could have contributed to the magnitude of the effect, it is very unlikely that that amount of contamination alone could have been responsible for the overall positive direction of the results.

The California Arithmetic Test was administered to pupils in the Mathematics Program during the first week of October, 1967, and the first week of June, 1968. A total of 1,656 pupils took both tests. Table 2 shows the mean gains in grade equivalents of a sample of 328 pupils selected by taking every fifth child in an alphabetical list. None of the pupils in the Mathematics Program was participating in another study.

TABLE 2

Average Arithmetic Gains in Grade Equivalents for Pupils in the Plus Program 1967-68

Grade	Sample N	Total N	Pretest Mean	Posttest Mean	Mean Months of Gain in 8 Months
1	2	10	1.0	1.4	4
2	60	303	1.5	2.3	8
3	68	346	2.6	3.5	9
4	73	370	3.5	4.5	10
5	74	377	4.6	5.5	9
6	42	212	5.3	6.3	10
7	5	25	6.7	7.4	7
8	3	5	6.6	7.7	11
Other	1	8	2.3	3.0	7
Total	328	1656			9

An examination of the figures in the table shows that the mean gains for the total sample and for five of the nine groups, representing about 80% of the mathematics pupils, were greater than the time between testings.

B. Other Evaluation Indices

Comments were collected from classroom teachers and principals. In general, they felt that the program had been effective in improving the children's achievement and attitudes. Parents of project children also made favorable comments.

Budget

The program was financed in full by funds from ESEA Title I grants.

The total cost for operating the program for one year was approximately $1,400,000, the majority of which was spent on salaries. An additional $200,000 had been spent on the purchase of room supplies and audio-visual equipment when the program started.

The per pupil cost for 1967-68 was $200 for teachers' salaries, with an additional $19 for reading materials, and $9.50 for mathematics materials.

The main sources of expenditure were:

A. Personnel

1 Project Administrator	part-time
2 Assistant Project Administrators	full-time
50 Mathematics Teachers	43 full-time, 7 part-time
112 Reading Teachers	102 full-time, 10 part-time
7 Librarians	full-time
2 Clerks	full-time

B. Supplies

Teaching Materials (each teacher ordered those appropriate for her students from a list which included the following.)

115 Paperback books
15 Series of reading textbooks and workbooks, some with charts, games, etc.
78 Visual-manipulative materials for teaching mathematics
2 Series of mathematics textbooks, workbooks, teacher's editions and duplicating masters, K-6

Audio-Visual

Overhead projectors, tape recorders, and record players were purchased for use by the teachers.

Classroom Supplies

Each teacher was supplied with the equipment necessary to maintain her classroom, such as filing cabinets, tables and chairs, chalkboards, etc.

Modifications and Suggestions

The project administrator suggested that the services of the corrective teachers would possibly reap even greater benefits if the teachers worked within the classrooms themselves, rather than tutoring small groups outside of the classroom. It has been felt in the past that an important aspect of the success of the program was the close coordination between the corrective teachers and their respective classroom teachers. Placing the remedial teachers within the classrooms should strengthen this relationship. A pilot program of this procedure is being conducted in the 1968-69 school year using 15 corrective teachers. Each teacher works in two classrooms in the morning and two in the afternoon. Evaluation of the results should follow the end of the school year.

Project personnel also felt that more emphasis should be placed on parent participation. They hoped to identify more areas for participation of parents in the program, define them precisely, and devise methods to encourage greater participation.

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